

Exploring Recent Advances: Education Techniques for Teaching DevOps in Software Engineering

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Outline

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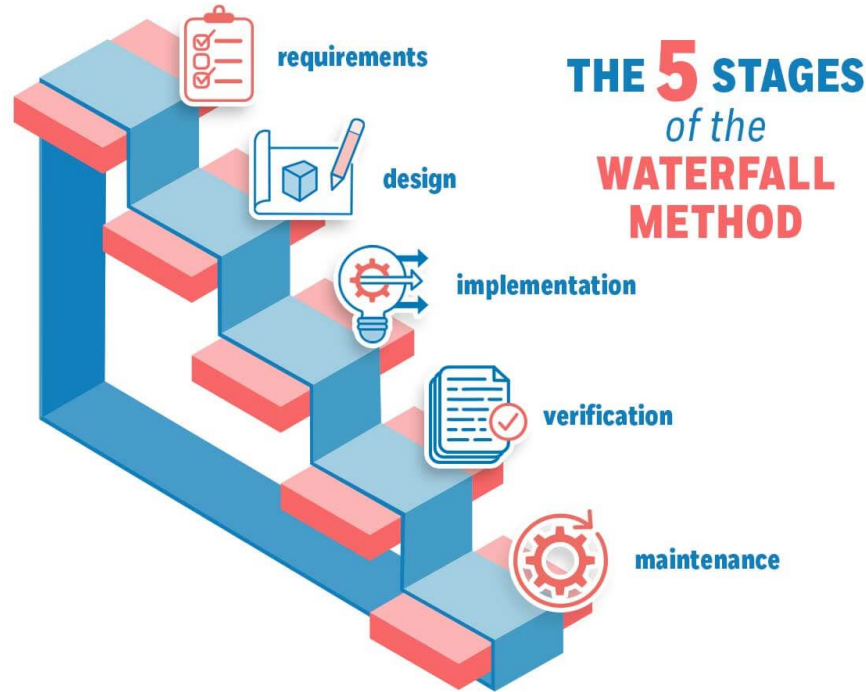
Introduction

- At 1985 - Waterfall
- 1995 - SCRUM
- 2001 - Movimento Ágil
- 2004 - O'Reilly OpenSpace Conference
- 2011 - Puppet Labs Relatory

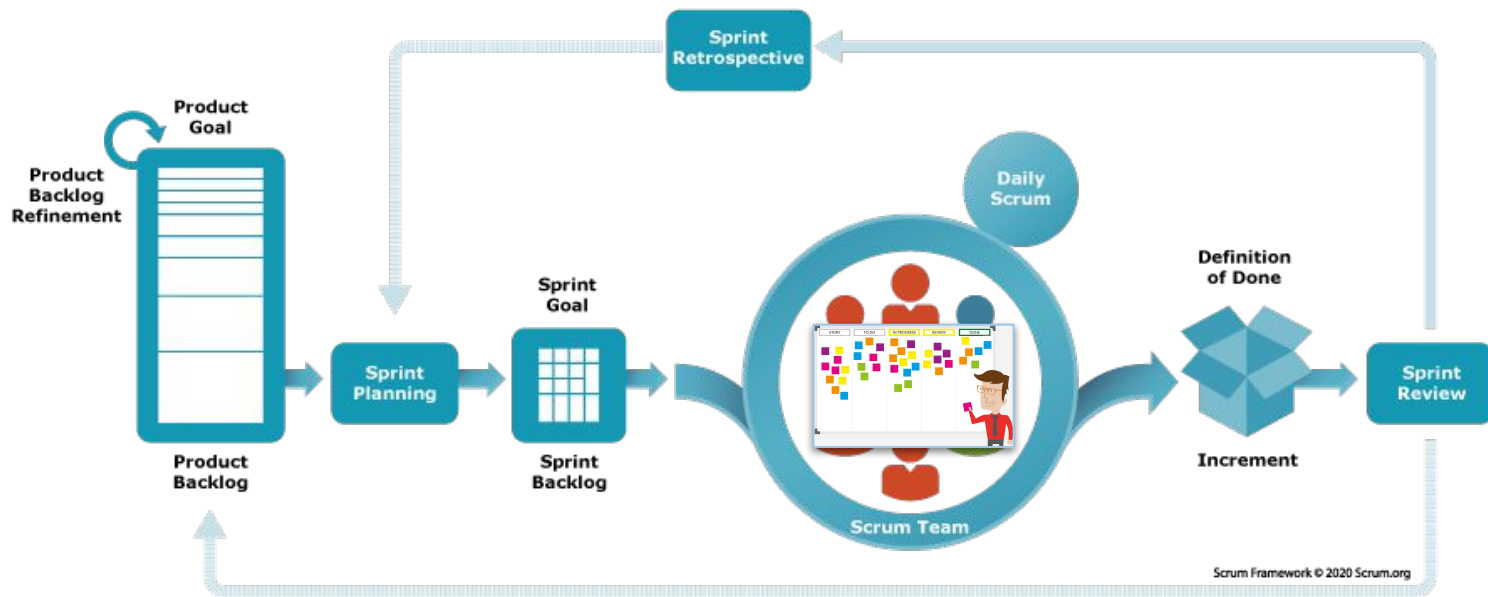
Introduction

- Towards definitions for release engineering and DevOps
 - *“DevOps aims to establish a mindset that focuses on a closer collaboration between teams by setting the common goal to develop high-quality software and operate resilient systems” (Dick et. al 2015)*
- Site Reliability Engineering (SRE)
 - *How Google Runs Production Systems (2016)*

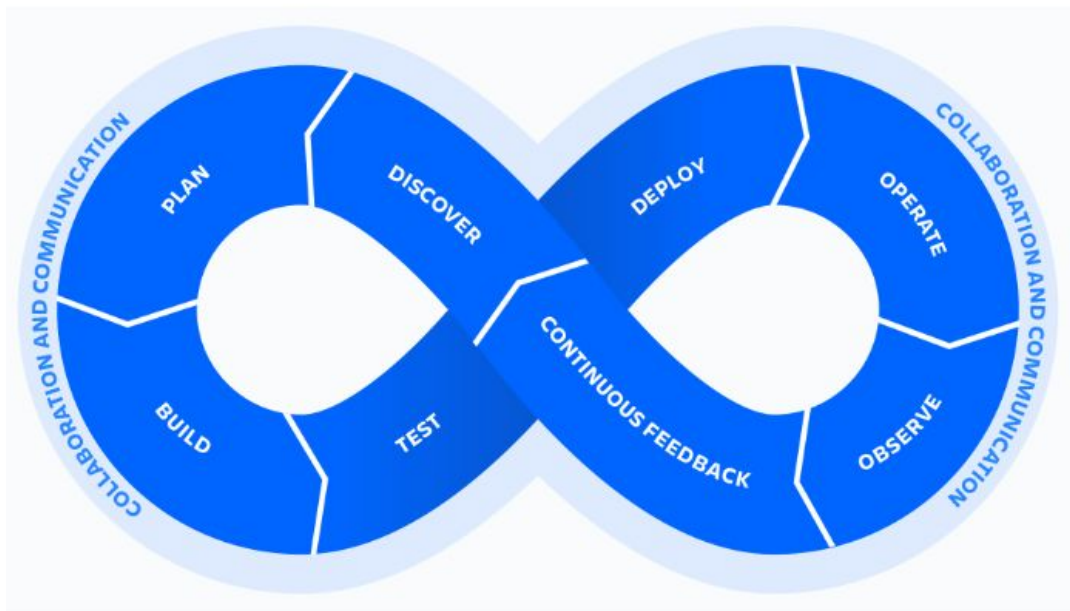
Introduction



Introduction



Introduction



Introduction

- A Survey of DevOps Concepts and Challenges
 - *“DevOps is a collaborative and multidisciplinary effort within an organization to automate continuous delivery of new software versions, while guaranteeing their correctness and reliability.” (Leite et. al 2019)*

Introduction

- A Survey of DevOps Concepts and Challenges
 - *“Finally, academic researchers conduct studies to determine the state of practice in DevOps, thereby contributing to discussions among engineers and managers, and educate a new generation of software engineers on DevOps principles and practices.” (Leite et. al 2019)*

Methods: Protocol

Objective

- Identify in the literature the existence of studies related to software engineering that have used education techniques to teach DevOps (subject, values and principles) in the last 5 years.

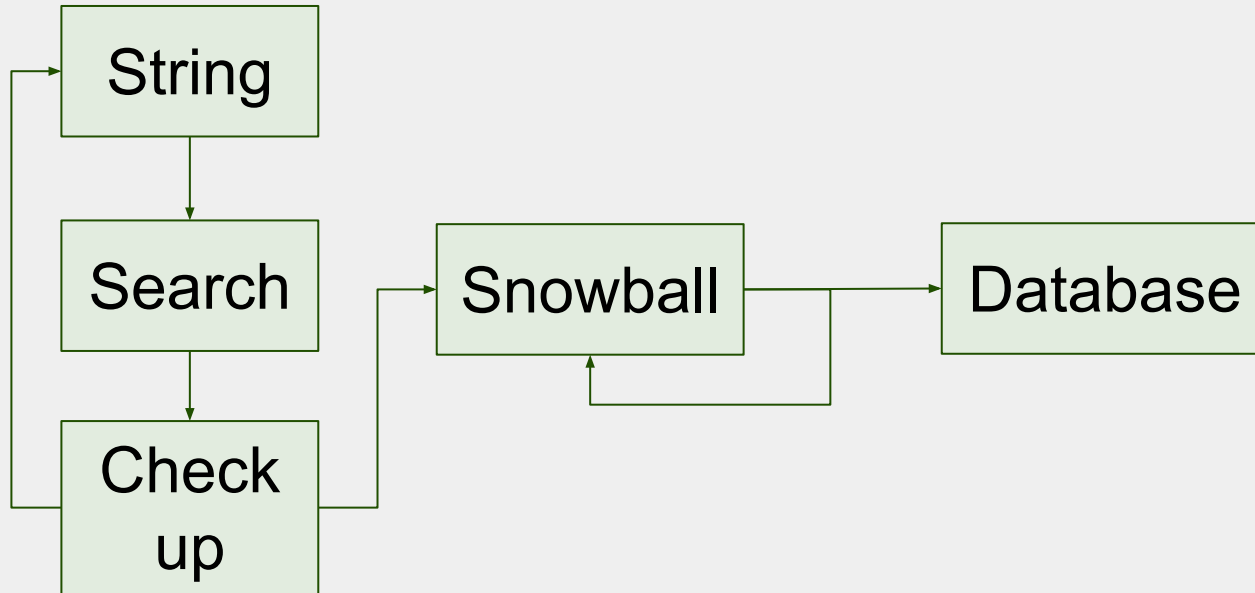
Methods: Protocol

Research Questions:

- RQ1: What techniques are used in Software Engineering Education to teach DevOps?
 - RQ2: What are the benefits of these techniques?
 - RQ3: What are the challenges of using these techniques?

Methods: Protocol

Selection Process

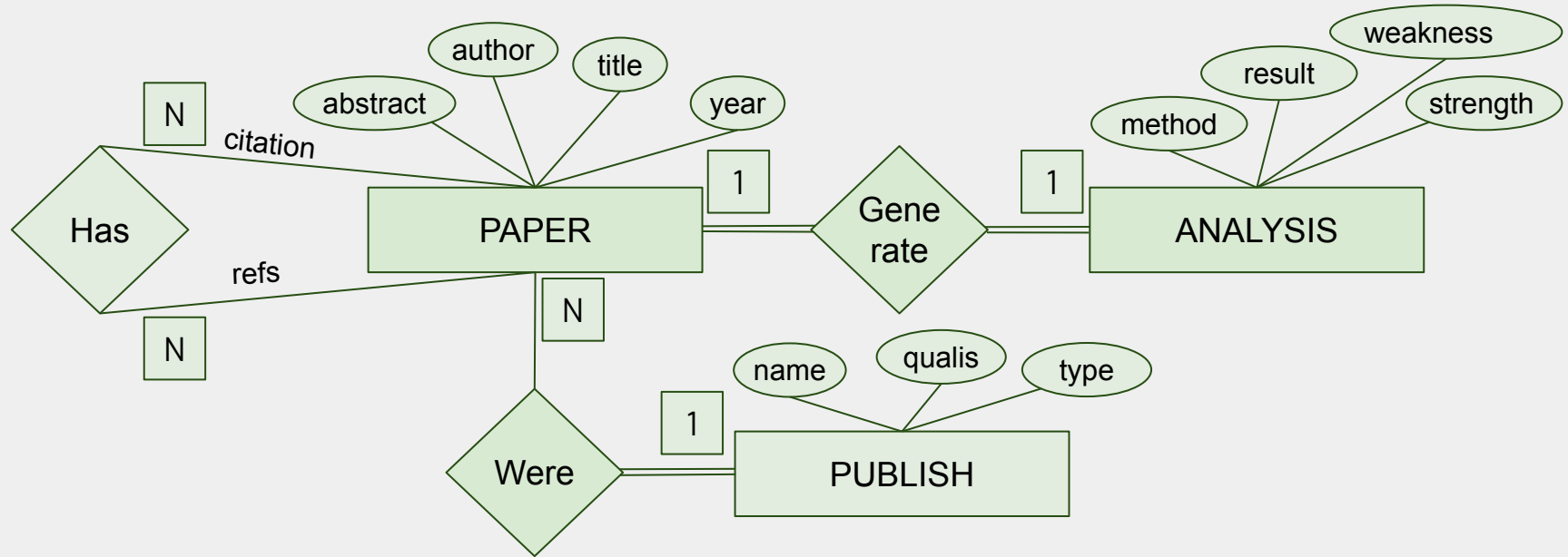


Methods: Protocol

Selection Criteria

- Include:
 - Publication date between 2019 and 2023.
- Exclude:
 - The paper does not pertain to subjects covered in the SWEBOK
 - Lack of specific techniques in teaching
 - The absence of specific techniques, values, or principles related to DevOps.
 - Any article not available in full-text.

Methods: Protocol



Methods: Protocol

**[("software engineering"
OR "software development")
AND "devops"
AND "education"]**

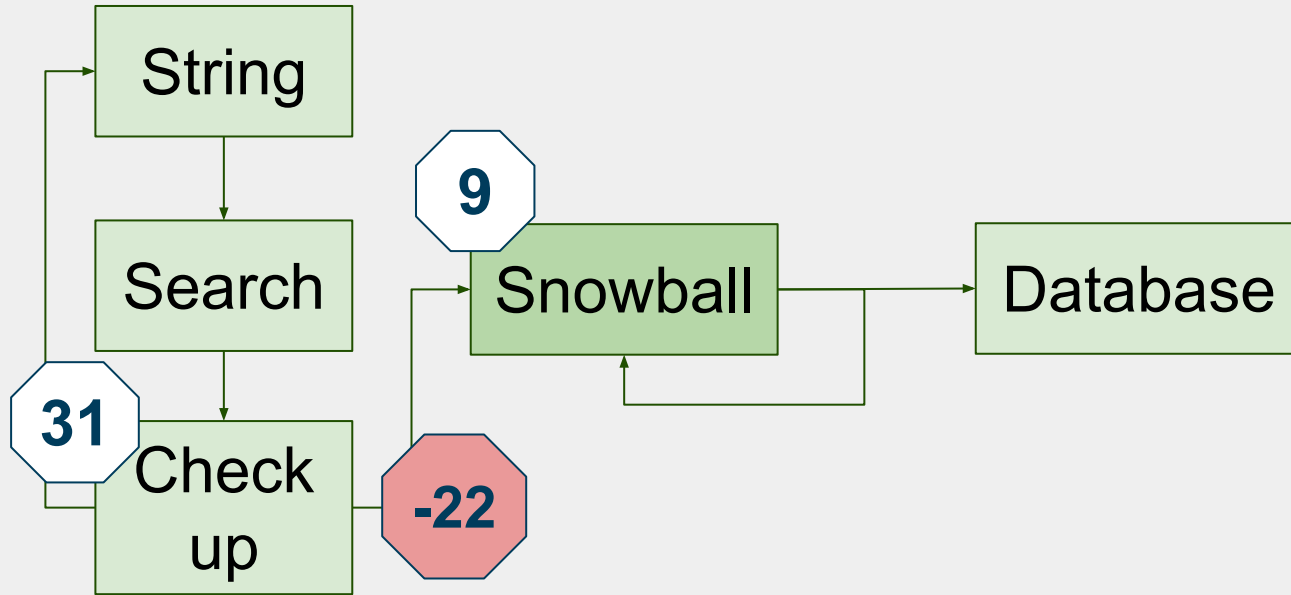
Methods: Terms in Abstracts

Seacher	Result
ACM Digital Library	21
IEEE Xplore	11
Science Direct	2

Table 01: "software engineering" OR "software development" AND "devops" AND "education"

Total 34
3 repeated

Methods: Selection Process



Methods: Snowball Seed

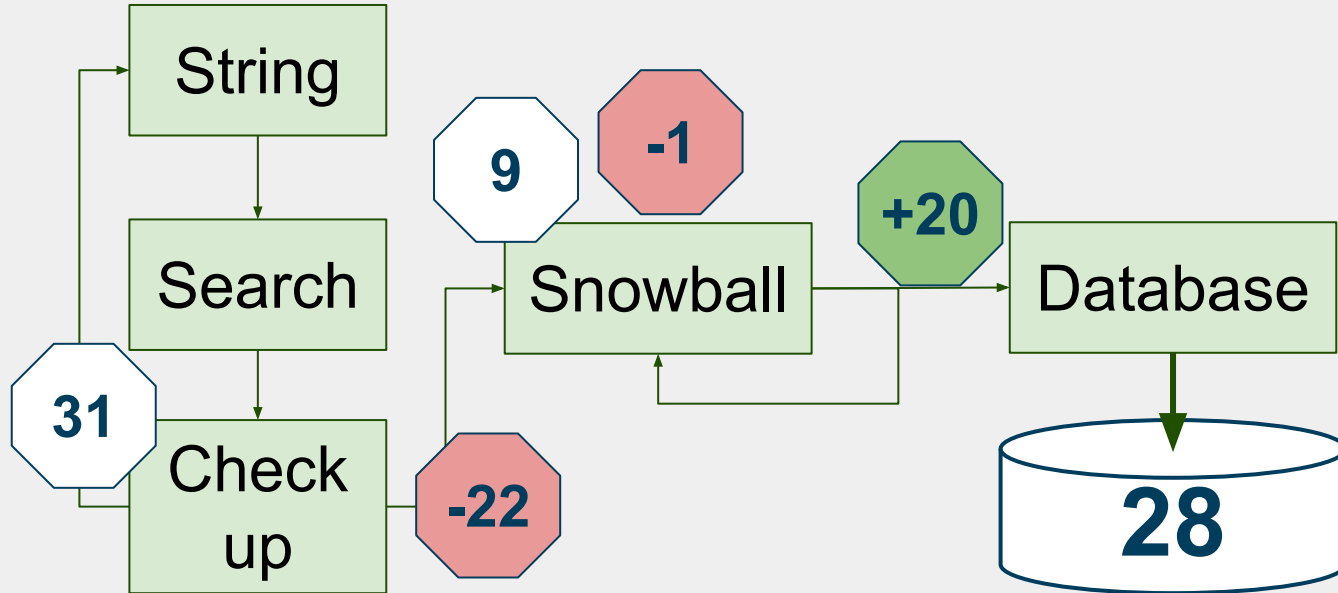
ID	Title	Year
3	Analysing the SWECOM Standard for Designing a DevOps Education Programme	2019
4	Teaching DevOps in Academia and Industry: Reflections and Vision	2019
5	Unveiling the Teaching Methods Adopted in DevOps Courses	2023
6	Shifting traditional undergraduate software engineering instruction to a DevOps focus	2021
7	Overcoming Challenges in DevOps Education through Teaching Methods	2023
8	Preparing Students for Software Production with DevOps: A Graduate Course Approach	2023
9	DevOps education: an interview study of challenges and recommendations	2022
11	Industry-academy collaboration in teaching DevOps and continuous delivery to software engineering students: towards improved industrial relevance in higher education	2019
17	Achievement unlocked: a case study on gamifying DevOps practices in industry	2022

Methods: Snowball

Start with 9 documents:

- 302 References
- 99 Citations (Google Scholar)

Methods: Selection Process



Analysis

Artigo: 3 - Analysing the SWECOM Standard for Designing a DevOps Education Programme

Contribuições:

- O artigo utiliza um processo de desenvolvimento baseado em padrões para derivar um programa educacional de DevOps.
- Fornece um programa abrangente de DevOps baseado no padrão SWECOM.
- Estrutura o programa em quatro níveis de aprendizagem alinhados com os esforços cognitivos.

Limitações:

- Processo e programa em estágio inicial de validação.
- Amostra limitada (experiência dos autores).

Como responde as QPs:

- QP1R: A técnica utilizada foi o desenvolvimento baseado em padrões.
- QP1.1R: Os principais benefícios é uma sugestão de programas de graduação em engenharia de software com foco em DevOps e a identificação de “níveis de aprendizagens cognitivos”.
- QP1.2: O principal desafio é a validação dos resultados onde o caminho encontrado foi se basear na experiência dos autores.

Analysis - The PRISMA Guide

- Published in *Journal of Clinical Epidemiology and International Journal of Surgery*
- Used to planning and conducting the systematic review
- Include the checklists with explanation and elaboration, and flow diagram for qualitative and quantitative analysis.